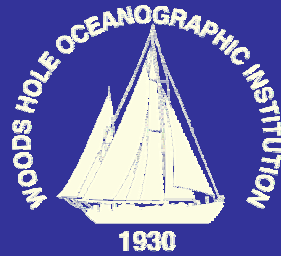


Tradeoffs in Coastal and Marine Spatial Planning for the US Northeast LME



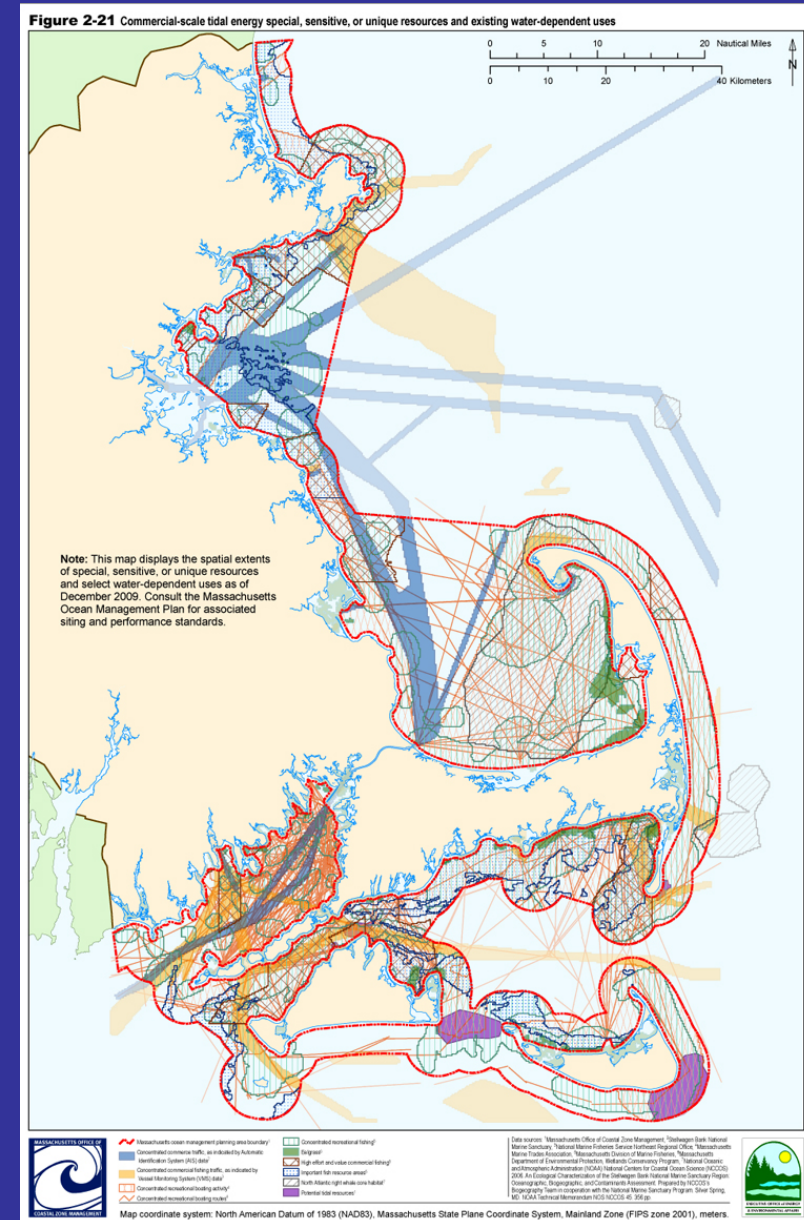
Porter Hoagland and Di Jin

Marine Policy Center
Woods Hole Oceanographic Institution
Woods Hole, MA 02543

ICES CM 2011/M

Central Issue

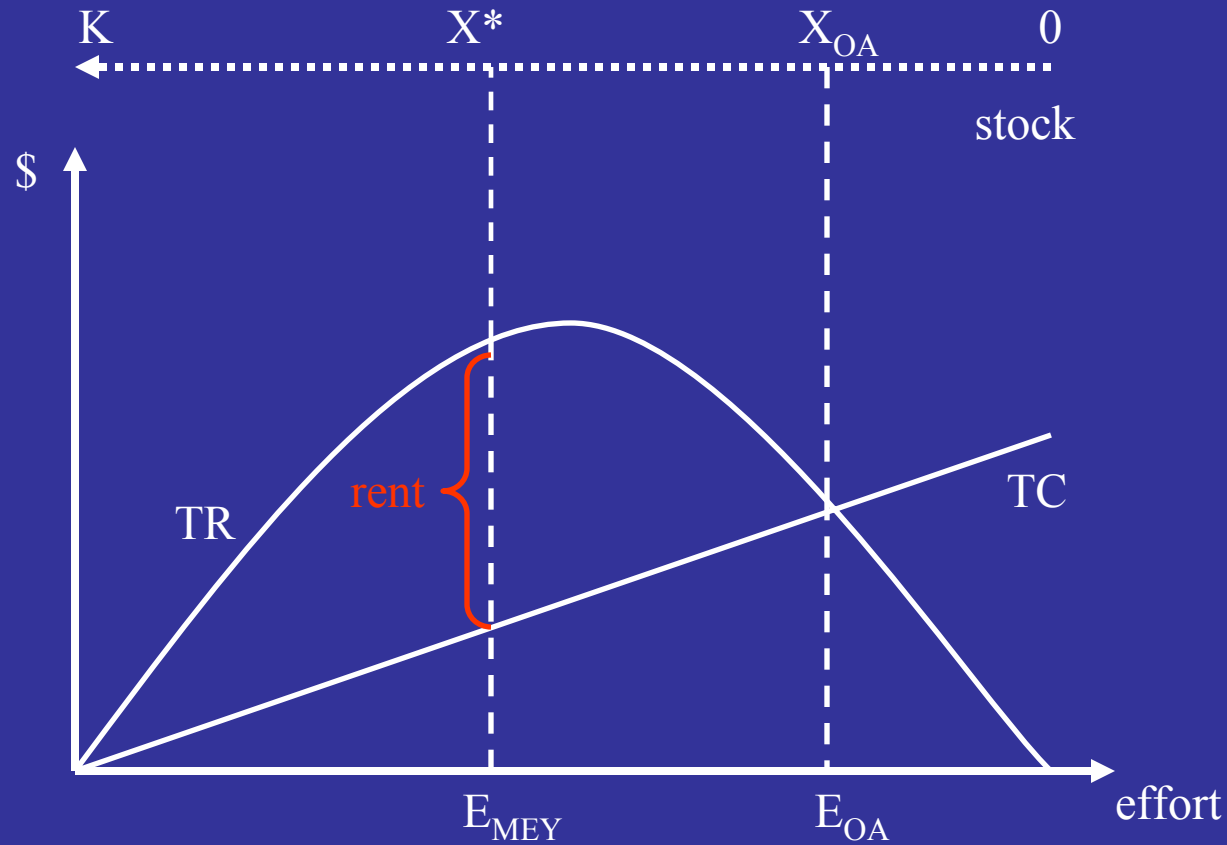
- Coastal ocean is becoming more crowded
- Seems rational to plan for what happens where
- Pre-existing uses often favored (public trust)
- Now fashionable to organize a political/regulatory process
- What are the pros and cons of such a process?
- How can tradeoffs be assessed when one type of use could displace another?



Some Possible Economic Models

Bio-economic: captures the complexity of non-linear systems but typically incorporates only 1-2 species and 1-2 industry impacts

Static Open-Access and Optimal Effort



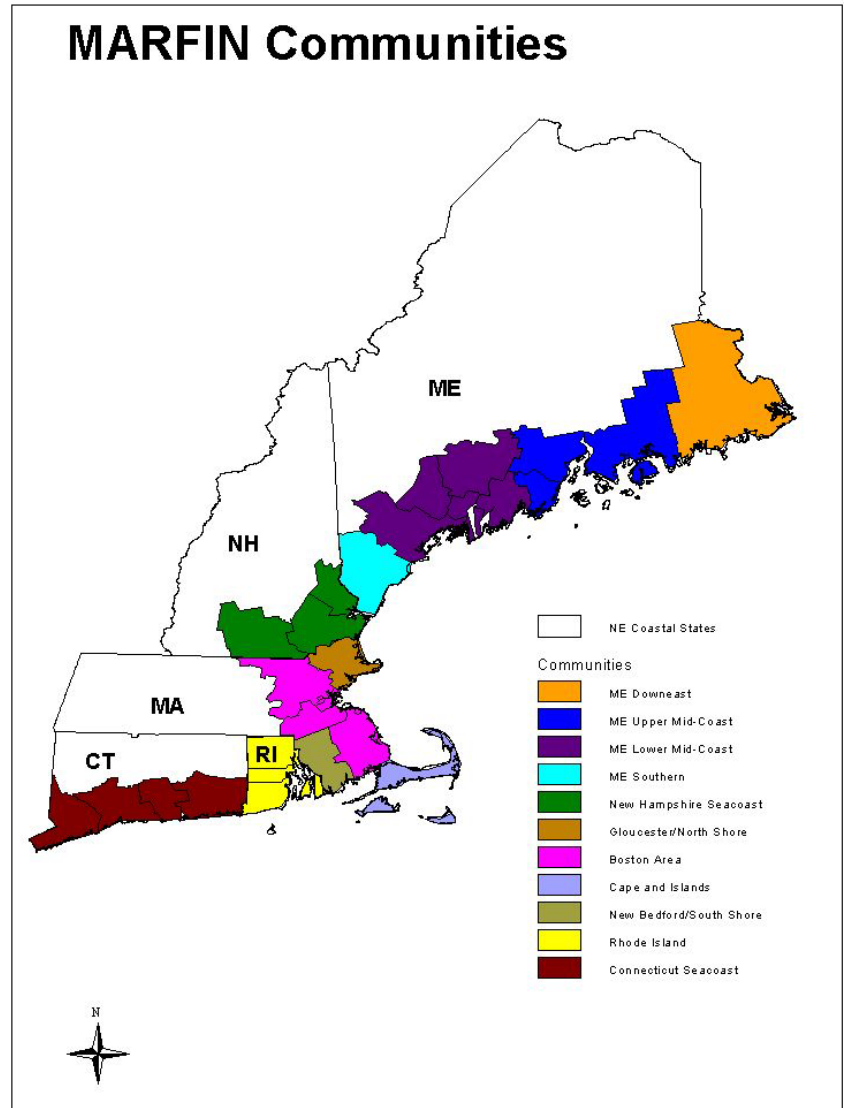
Some Possible Economic Models

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Input-output (I-O): includes many (500-600) industries (fisheries can be disaggregated by species, gear types, communities), but all coefficients (e.g., prices) are fixed

Input-Output Model Applications

- Evaluation of economic impacts:
 - Fishery conservation and management alternatives
 - Distribution across fishing communities
 - Distribution across industry sectors
- Fleet rationalization efforts:
 - American lobster
 - Sea scallops



Some Possible Economic Models

Bio-economic: captures the complexity of non-linear systems but incorporates only 1-2 species and 1-2 industry impacts

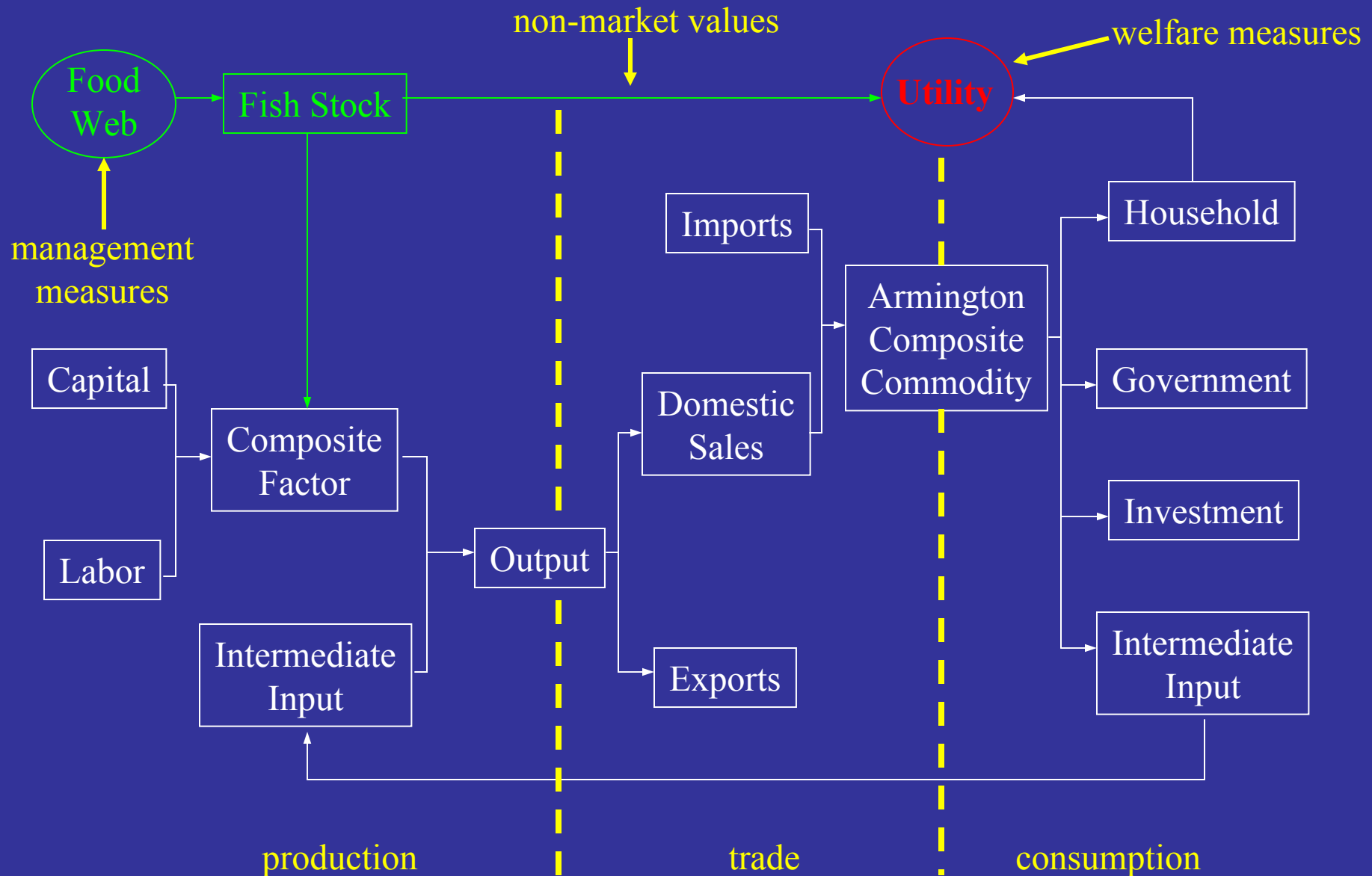
Input-output (I-O): includes many (500-600) industries (fisheries can be disaggregated by species, gear types, communities), but all coefficients (e.g., prices) are fixed

Computable general equilibrium (CGE): captures some key non-linear interactions and develops estimates of welfare changes, but limits on industry sectors

Major Features of a CGE Model

1. Multiple sectors, nonlinear, subject to resource constraints.
2. Supply and demand are derived from the behavior of profit-maximizing producers and utility-maximizing consumers.
3. Supply and demand for goods and production factors are equated by adjusting prices so that markets clear in equilibrium.

Basic Components of a CGE Model



Regional Economic Impact Models, Model Outputs, and Tradeoff Measures

Regional Economic Impact Model	Model Outputs	Tradeoff Measures
Input-Output (IO)	Output*	Sales of goods and services by industry
	Personal income*	Personal and self-employed income
	Employment*	Full- and part-time jobs by industry
	Induced Effects	Personal consumption expenditures
	Value added*	Gross state (county) product
	Tax revenues*	Government tax receipts
Computable General Equilibrium (CGE)	Equivalent variation	Net economic benefits
	Equilibrium price	Prices of goods and services
	Equilibrium quantity	Quantities of goods and services

New England Coastal Regional Economy

Baseline Economic Values

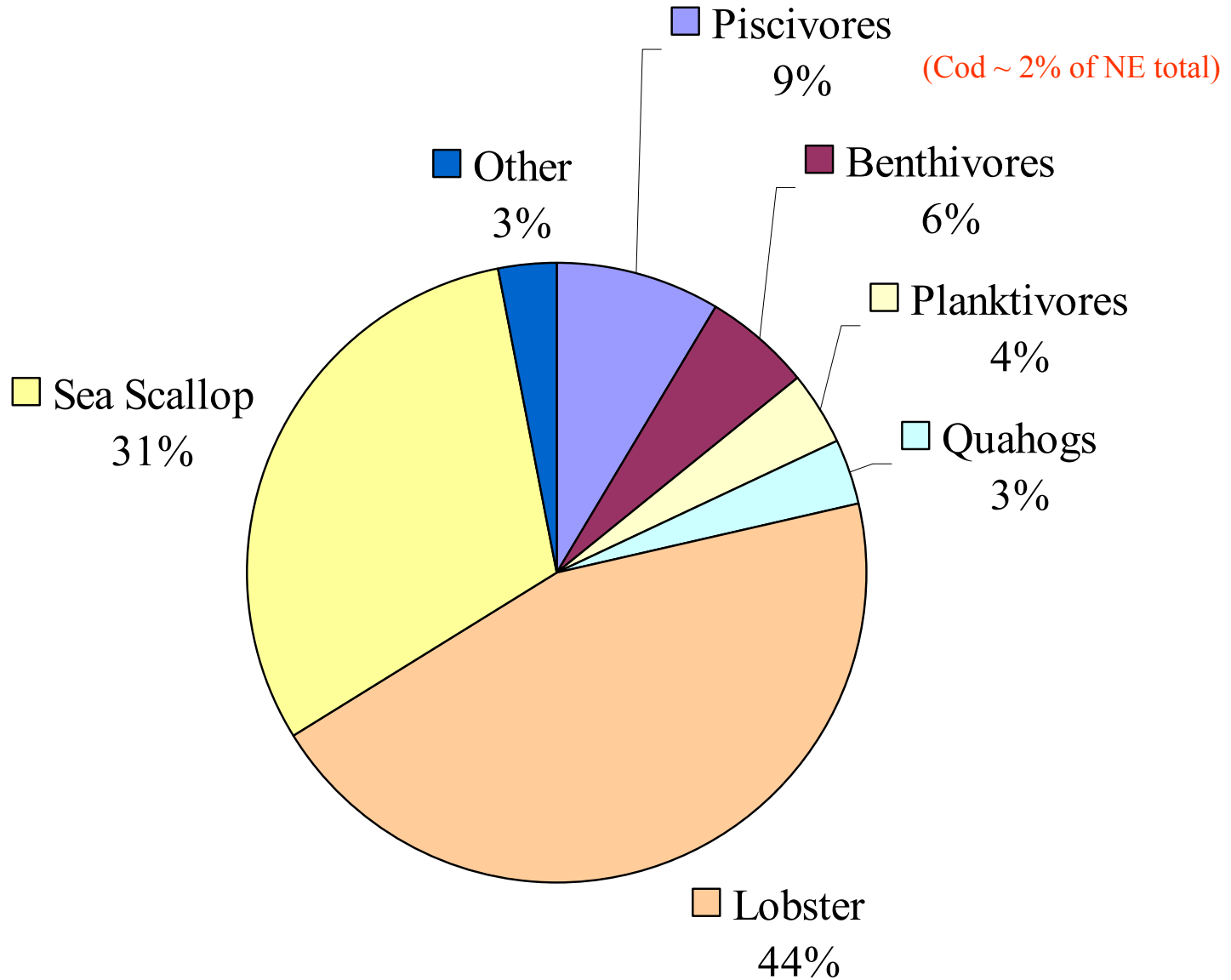
(\$m 2006)

<u>Sector</u>	* <u>Total Supply</u>	** <u>Imports</u>	** <u>Exports</u>
Fishing	653	42	259
Fish Processing	543	126	708
Agriculture	7,790	5,734	498
Manufacturing	247,124	90,030	37,608
Other	673,199	131,211	208,336

* Composite Commodity

** Including both domestic and foreign trade

Value Share of NE Landings: 2006



Potential Effect of Wind Farm Closure

- Region comprises the New England coastal fishing communities
- **Hypothetical** large-scale closure of trawling due to renewable energy leasing and siting (assume lose 10% of open area)
- Costs are lost EV surpluses (% of income) per representative household in each income group
- Distribution is skewed, reflecting a regressive effect on lower income groups (although the size of the effect is small in this example)
- Could also map across communities to understand the spatial impacts onshore

